CLAIMS

What is claimed is:

1. An antenna receiving system comprising:

a first antenna configured to receive satellite signals from a first coverage area;

a second antenna configured to receive satellite signals from a second coverage area, wherein a transition zone exists where a portion of the second coverage area overlaps a portion of the first coverage area; and

a processor being operable to receive satellite signals from the first antenna and from the second antenna and to compensate for differences of delays in the satellite signals received within the transition zone.

2. The system of claim 1, wherein at least one of the first antenna and the second antenna comprises an antenna array.

3. The system of claim 1, wherein the first antenna is a high zenith antenna.

4. The system of claim 1, wherein the first antenna receives satellite signals at observation angles from about 30 to about 90 degrees.

5. The system of claim 1, wherein the second antenna receives satellite signals at observation angles from about 5 to about 30 degrees.

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6. The system of claim 1, wherein the transition zone is an area where the first antenna and the second antenna have an observation angle in the range of about 25 to about 35 degrees

7. The system of claim 1, wherein the processor compensates for differences of delays in the satellite signals received by adjusting a delay in the satellite signals received from the first antenna to match a delay in the satellite signals received from the second antenna.

8. The system of claim 1, wherein the processor compensates for differences of delays in the satellite signals received by adjusting a delay in the satellite signals received from the second antenna to match a delay in the satellite signals received from the first antenna.

9. The system of claim 1, wherein while a satellite is in the transition zone, the processor receives satellite signals from both the first antenna and the second antenna, and wherein the processor determines a first pseudorange value from the signals received at the first antenna and determines a second pseudorange value from the signals received at the second antenna.

10. The system of claim 9, wherein the processor uses the differences of delays in the satellite signals to match the delays of the satellite signals so as to synchronize the first pseudorange value and the second pseudorange value.

11. The system of claim 1, wherein the system is a Local Area Augmentation System (LAAS) Ground Facility (LGF).

12. In a dual antenna receiving system, a method comprising:

determining a first pseudorange value from signals received within a first coverage area by a first antenna;

determining a second pseudorange value from signals received within a second coverage area by a second antenna, wherein a transition zone exists where a portion of the second coverage area overlaps a portion of the first coverage area;

making a comparison of the first pseudorange value and the second pseudorange value that were each determined from signals received within the transition zone; and

based on the comparison, adjusting the first pseudorange value.

13. The method of claim 12, wherein making the comparison of the first pseudorange value and the second pseudorange value comprises calculating a difference in delays between the first pseudorange value and the second pseudorange value.

14. The method of claim 13, wherein adjusting the first pseudorange value comprises adding the difference in delays to the first pseudorange value if the first pseudorange value has a delay that is less than a delay of the second pseudorange value.

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15. The method of claim 13, wherein adjusting the first pseudorange value comprises subtracting the difference in delays from the first pseudorange value if the first pseudorange value has a delay that is greater than a delay of the second pseudorange value.

16. The method of claim 12, further comprising:

determining a first phase center variation of signals received at the first antenna; and

determining a second phase center variation of signals received at the second antenna.

17. The method of claim 16, further comprising adjusting the first pseudorange value using the first phase center variation and adjusting the second pseudorange value using the second phase center variation.

18. In a dual antenna receiving system, a method comprising:

determining a first pseudorange value from signals received at a first antenna;

determining a second pseudorange value from signals received at a second antenna;

calculating a difference in hardware group delays between the first pseudorange value and the second pseudorange value;

calculating an estimate of the difference in hardware group delays over a time interval;

comparing the estimate to a previous estimate of the differences in hardware group delays; and

if a variation between the estimate and the previous estimate is present:

calculating an adjusted estimate of the differences in hardware group delays; and

adjusting the first pseudorange value using the adjusted estimate.

19. The method of claim 18, wherein if no variation between the estimate and the previous estimate is present, the step of adjusting comprises adjusting the first pseudorange value using the estimate.

20. A method comprising:

using two or more antennas to receive satellite signals, where each antenna has a respective field of view, and where a transition zone exists where satellite signals are received from each of the two or more antennas;

means for determining a phase center variation as a function of time from the satellite signals to determine pseudorange values;

means for compensating for the phase center variation in the satellite signals received from within the transition zone;

means for forming hardware group delay estimates of delays within the satellite signals received within the transition zone;

means for averaging the hardware group delay estimates to calculate a hardware group delay average; and

means for compensating the satellite signals using the hardware group delay average.

21. The method of claim 20, further comprising means for updating a current hardware group delay estimate based on previous hardware group delay estimates.

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